

●Safety Precautions

- 1) The products are designed and produced for application in ordinary electronic equipment (AV equipment, OA equipment, telecommunication equipment, home appliances, amusement equipment, etc.).
If the products are to be used in devices requiring extremely high reliability (medical equipment, transport equipment, aircraft/spacecraft, nuclear power controllers, fuel controllers, car equipment including car accessories, safety devices, etc.) and whose malfunction or operational error may endanger human life and sufficient fail-safe measures, please consult with the ROHM sales staff in advance.
If product malfunctions may result in serious damage, including that to human life, sufficient fail-safe measures must be taken, including the following:
 - [a] Installation of protection circuits or other protective devices to improve system safety
 - [b] Installation of redundant circuits in the case of single-circuit failure
- 2) The products are designed for use in a standard environment and not in any special environments.
Application of the products in a special environment can deteriorate product performance.
Accordingly, verification and confirmation of product performance, prior to use, is recommended if used under the following conditions:
 - [a] Use in various types of liquid, including water, oils, chemicals, and organic solvents
 - [b] Use outdoors where the products are exposed to direct sunlight, or in dusty places
 - [c] Use in places where the products are exposed to sea winds or corrosive gases, including Cl₂, H₂S, NH₃, SO₂, and NO₂
 - [d] Use in places where the products are exposed to static electricity or electromagnetic waves
 - [e] Use in proximity to heat-producing components, plastic cords, or other flammable items
 - [f] Use involving sealing or coating the products with resin or other coating materials
 - [g] Use involving unclean solder or use of water or water-soluble cleaning agents for cleaning after soldering
 - [h] Use of the products in places subject to dew condensation
- 3) The products are not radiation resistant.
- 4) Verification and confirmation of performance characteristics of product, after on-board mounting, is advised.
- 5) In particular, if a transient load (a large amount of load applied in a short period of time, such as pulse) is applied, confirmation of performance characteristics after on-board mounting is strongly recommended.
Avoid applying power exceeding normal rated voltage; exceeding the voltage rating under steady-state
- 6) Loading condition may negatively affect product performance and reliability. De-rate Rated voltage (Pd) depending on Ambient temperature (Ta). When used in sealed area, confirm the actual ambient temperature.
- 7) Confirm that operation temperature is within the specified range described in product specification.
- 8) Failure induced under deviant condition from what defined in the product specification can be not be Guaranteed.
- 9) When product safety related problems arises, please immediately inform to ROHM, and consider technical counter measure.

●Precaution for Mounting/Circuit board design

- 1) When a highly active halogenous (chlorine, bromine, etc.) flux is used, the remainder of flux may negatively affect product performance and reliability.
- 2) In principle, the reflow soldering method must be used; if flow soldering method is preferred, please consult with the company in advance.

●Precautions Regarding Application Examples and External Circuits

- 1) If change is made to the constant of an external circuit, allow a sufficient margin due to variations of the characteristics of the products and external components, including transient characteristics, as well as static characteristics.
- 2) The application examples, their constants, and other types of information contained herein are applicable only when the products are used in accordance with standard methods. Therefore, if mass production is intended, sufficient consideration to external conditions must be made.

● Precaution for Electrostatic

This product is Electrostatic sensitive product, which may be damaged due to Electrostatic discharge. Please take proper caution during manufacturing and string so that voltage exceeding Product maximum rating won't be applied to products. Please take special care under dry condition (e.g. Grounding of human body /equipment /solder iron, isolation from charged objects, setting of Ionizer, friction prevention and temperature /humidity control).

● Precaution for storage/Transportation

- 1) Product performance and soldered connections may deteriorate if the products are stored in the following places:
 - [a] Where the products are exposed to sea winds or corrosive gases, including Cl₂, H₂S, NH₃, SO₂, and NO₂
 - [b] Where the temperature or humidity exceeds those recommended by the Company Temperature:5-40°C, Humidity 30-70% (Put condition for individual product)
 - [c] Storage in direct sunshine or condensation
 - [d] Storage in high Electrostatic
- 2) Even under ROHM recommended storage condition, solderability of products over 1 year old (Put condition for each product) may be degraded. It is strongly recommended storage time period · Recommended storage condition : Temperature 5-40°C, Humidity 30-70%(Put condition for individual product)
- 3) Store / transport cartons in the correct direction, which is indicated on a carton as a symbol. Otherwise bent leads may occur due to excessive stress applied when dropping of a carton.
- 4) For dry packed products, use products within the specified time after opening a dry bag. When exceeded the specified time please bake products under the below condition before using.
 - Maximum time: Within a week
 - Baking condition: For reel:40°C, 192 hours

● Precaution for product label

QR code printed on ROHM product label is only for internal use, and please do not use at customer site. It might contain a internal part number that is inconsistent with an product part number.

● Precaution for disposition

When disposing products please dispose them properly with an industry waste company.

● Precautions for Foreign exchange and Foreign trade act

Tantalum Capacitors that ROHM Co., Ltd. sells are not applicable to controlled goods in Annex 1(Item 1~15) of Export Trade Control Order.*)

But it is an object of controlled goods in Annex 1(Item 16) of Export Trade Control Order. In case of export, please confirm if it applies to "objective" criteria or an "informed" (by MITT clause) on the basis of "catch-all" controls for Non-Proliferation of Weapons of Mass Destruction.

● Precaution for Mounting/Circuit board design

- 1) These Specifications contain information related to the ROHM industrial property. Any use of them other than pertaining to the usage of appropriate products is not permitted. Duplication of these Specifications and its disclosure to a third party without the Company's permission is prohibited.
- 2) Information and data on products, including application examples, contained in these specifications are simply for reference; the Company does not guarantee any industrial property rights, intellectual property rights, or any other rights of a third party regarding this information or data. Accordingly, the Company does not bear any responsibility for:
 - [a] infringement of the intellectual property rights of a third party
 - [b] any problems incurred by the use of the products listed herein.
- 3) The Company prohibits the purchaser of its products to exercise or use the intellectual property rights, industrial property rights, or any other rights that either belong to or are controlled by the Company, other than the right to use, sell, or dispose of the products.

● Precautions on Use of Products

- 1) Verification and confirmation of performance characteristics of products, after on-board mounting, is advised.
- 2) In particular, if a transient load (a large amount of load applied in a short period of time, such as pulse) is applied, confirmation of performance characteristics after on-board mounting is strongly recommended.
Avoid applying power exceeding normal rated voltage; exceeding the voltage rating under steady-state loading condition may negatively affect product performance and reliability.

3) Allowable ripple voltage

Allowable difference of temperature increase from ambient temperature is below 5°C.

There is a case of leading short circuit by getting dielectric debased and self-heated when it exceeds 5°C.

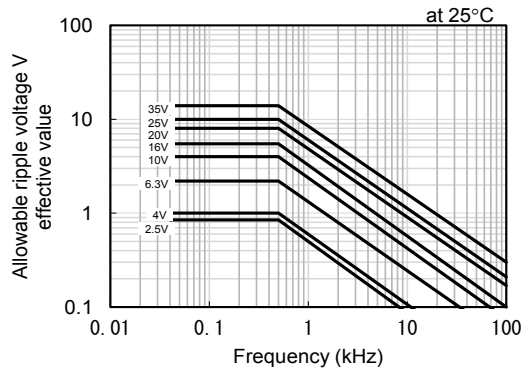
- The sum of the peak values of DC and AC voltages should not exceed the rated voltage.
- The ripple voltage, if applied, should not exceed the values in the figure below. However, the allowable ripple voltage at a high temperature should be calculated using the equation below.

E = Allowable ripple voltage

$$E \text{ MAX. (at } 50^{\circ}\text{C)} = 0.7 \times E \text{ MAX. (at } 25^{\circ}\text{C)}$$

$$E \text{ MAX. (at } 85^{\circ}\text{C)} = 0.5 \times E \text{ MAX. (at } 25^{\circ}\text{C)}$$

$$E \text{ MAX. (at } 125^{\circ}\text{C)} = 0.3 \times E \text{ MAX. (at } 25^{\circ}\text{C)}$$



- 4) The voltage reduction should be as large as possible. (Recommend less than 1/2 rated voltage.)
Especially, a voltage lower than 1/3 of the rated voltage is recommended when used in low impedance circuit.
- 5) Tester must not be contacted with a capacitor. If it is done, an excessive or reverse voltage may be applied to the capacitor.
- 6) +85~+125°C : with voltage derating.
- 7) Apply the series-resistor 3Ω per 1v.
- 8) When a highly active halogenous (chlorine, bromine, etc.) flux is used, the remainder of flux may negatively affect product performance and reliability. Use the flux with no halogenous.
- 9) In principle, the reflow soldering method must be used; if flow soldering method is preferred, please consult with the Company in advance.
And in case of ultrasonic cleaning, please consult with the Company.
- 10) The slightly undulation into mold surface may occur after soldering, due to soldering temperature is greater than 150°C that is transfer temperature of mold resin.

Notes

- 1) The information contained herein is subject to change without notice.
- 2) Before you use our Products, please contact our sales representative and verify the latest specifications :
- 3) Although ROHM is continuously working to improve product reliability and quality, semiconductors can break down and malfunction due to various factors.
Therefore, in order to prevent personal injury or fire arising from failure, please take safety measures such as complying with the derating characteristics, implementing redundant and fire prevention designs, and utilizing backups and fail-safe procedures. ROHM shall have no responsibility for any damages arising out of the use of our Products beyond the rating specified by ROHM.
- 4) Examples of application circuits, circuit constants and any other information contained herein are provided only to illustrate the standard usage and operations of the Products. The peripheral conditions must be taken into account when designing circuits for mass production.
- 5) The technical information specified herein is intended only to show the typical functions of and examples of application circuits for the Products. ROHM does not grant you, explicitly or implicitly, any license to use or exercise intellectual property or other rights held by ROHM or any other parties. ROHM shall have no responsibility whatsoever for any dispute arising out of the use of such technical information.
- 6) The Products are intended for use in general electronic equipment (i.e. AV/OA devices, communication, consumer systems, gaming/entertainment sets) as well as the applications indicated in this document.
- 7) The Products specified in this document are not designed to be radiation tolerant.
- 8) For use of our Products in applications requiring a high degree of reliability (as exemplified below), please contact and consult with a ROHM representative : transportation equipment (i.e. cars, ships, trains), primary communication equipment, traffic lights, fire/crime prevention, safety equipment, medical systems, servers, solar cells, and power transmission systems.
- 9) Do not use our Products in applications requiring extremely high reliability, such as aerospace equipment, nuclear power control systems, and submarine repeaters.
- 10) ROHM shall have no responsibility for any damages or injury arising from non-compliance with the recommended usage conditions and specifications contained herein.
- 11) ROHM has used reasonable care to ensure the accuracy of the information contained in this document. However, ROHM does not warrant that such information is error-free, and ROHM shall have no responsibility for any damages arising from any inaccuracy or misprint of such information.
- 12) Please use the Products in accordance with any applicable environmental laws and regulations, such as the RoHS Directive. For more details, including RoHS compatibility, please contact a ROHM sales office. ROHM shall have no responsibility for any damages or losses resulting from non-compliance with any applicable laws or regulations.
- 13) When providing our Products and technologies contained in this document to other countries, you must abide by the procedures and provisions stipulated in all applicable export laws and regulations, including without limitation the US Export Administration Regulations and the Foreign Exchange and Foreign Trade Act.
- 14) This document, in part or in whole, may not be reprinted or reproduced without prior consent of ROHM.



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More detail product informations and catalogs are available, please contact us.

ROHM Customer Support System

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